PATENT ABSTRACTS OF JAPAN

(11)Publication number : **11-110915**
(43)Date of publication of application : **23.04.1999**

(51)Int.CI. G11B 20/10

(21)Application number : **09-267483**
(22)Date of filing : **30.09.1997**

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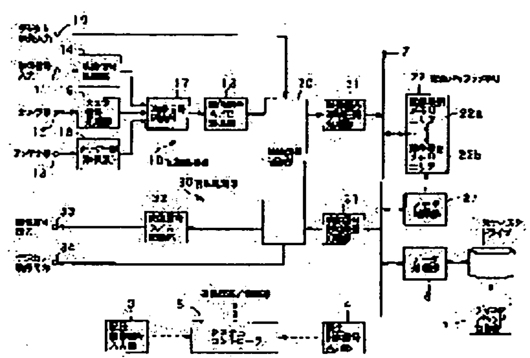
(54) SIGNAL RECORDING AND REPRODUCING DEVICE AND METHOD

(57)Abstract:
PROBLEM TO BE SOLVED: To prevent an underflow and an overflow from being generated by providing recording areas for a recording system and for a reproduction system and an integrated storage means making assignments of respective storage areas variable and controlling assigning of integrated storage areas according to a desired recording and/or a desired reproduction mode to simplify a hardware constitution.
SOLUTION: An integrated buffer memory 22 is arranged at the back of a band of video signal compression processing part 21 and the front of a band of video signal expansion processing part 31. When the generation amount of a signal from the band of video signal compression processing part 21 is increased at the time of recording and the waiting time of an optical disk drive 1 is large, an overflow is avoided by diverting a memory area for a reproduction system 22b to the purpose of a memory area for a recording system 22a by the control of a system controller 5. Moreover, at the time of reproduction, when frequencies of seeks and jumps are numerous, an underflow is avoided by diverting the memory area for the recording system 22a to the purpose of the memory area for the reproduction system 22b.



LEGAL STATUS

[Date of request for examination] 15.12.2003

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]
[Patent number]
[Date of registration]
[Number of appeal against examiner's decision of rejection]
[Date of requesting appeal against examiner's decision of rejection]
[Date of extinction of right]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the signal record playback approach performed by the signal record regenerative apparatus which reproduces the signal recorded while recording the signal on the record medium, and this equipment.
[0002]
[Description of the Prior Art] For example, in the video-signal record regenerative apparatus which uses an optical disk as a record medium, in order to compensate the track jump of a disk drive, and the latency time generated by seeking etc., the buffer memory for the object for recording systems and reversion systems is required.
[0003] Conventionally, by the device, as this buffer memory, it had two, a recording system and a reversion system, and used properly according to the recording system mode or reversion system mode specified by the user.
[0004]
[The technical problem which invention will solve and to carry out] By the way, in the above-mentioned video-signal record regenerative apparatus, the demand of wanting to reproduce the record video signal of a part with which time amount already passed, for example while continuing the record in this time etc. has increased.
[0005] for this reason -- being alike -- although the improvement in the response of a reversion system was required, as mentioned above, since the separate buffer memory the object for recording systems and for reversion systems was properly used according to desired recording system mode or reversion system mode, in the former, it was impossible for the control approach and hardware structure to have become complicated, and to have assigned the buffer memory for recording systems to reversion systems. For this reason, when raising the response of a reversion system, the buffer memory for the further reversion systems needed to be added.
[0006] this invention is made in view of the above-mentioned actual condition -- having -- a hardware configuration -- simple -- becoming -- in addition -- and it aims at offer of the signal record regenerative apparatus and approach of suppressing generating of the underflow of a storage means, and overflow.
[0007]
[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the signal record regenerative apparatus concerning this invention has a storage region the object for recording systems, and for reversion systems, and is equipped with the integrated storage means which carries out adjustable [of the assignment of each of these storage regions], and the control means which controls storage region quota processing of the above-mentioned integrated storage means according to desired record and/or the reproductive mode.
[0008] Here, the above-mentioned control means makes recording systems the above-mentioned storage region of the above-mentioned integrated storage means at the time of a recording mode, and makes it reversion systems at the time of a playback mode.
[0009] Moreover, the above-mentioned control means divides the above-mentioned storage region of the above-mentioned integrated storage means into the object for recording systems, and reversion systems at the time of a coincidence record playback mode.
[0010] Moreover, the overflowed signal generated in the storage region for recording systems at the time of

the above-mentioned coincidence record playback mode is written in the storage region assigned to the above-mentioned reversion system by control of the above-mentioned control means. Moreover, the above-mentioned integrated storage means is used for edit processing.
[0011] Moreover, the signal record playback approach concerning this invention carries out adjustable [of the quota processing of the storage region the object for the recording systems of the storage section, and for reversion systems] according to desired record and/or the reproductive mode, in order to solve the above-mentioned technical problem.
[0012] Here, the above-mentioned storage region of the above-mentioned storage section is made into recording systems at the time of a recording mode, and it carries out to reversion systems at the time of a playback mode.
[0013] Moreover, at the time of a coincidence record playback mode, the above-mentioned storage region of the above-mentioned storage section is divided into the object for recording systems, and reversion systems.
[0014] Moreover, the overflowed signal generated in the storage region for recording systems at the time of the above-mentioned coincidence record playback mode is written in the storage region assigned to the above-mentioned reversion system. Moreover, the above-mentioned storage section is used for edit processing.
[0015] thus, the thing for which the buffer memory the object for recording systems and for reversion systems is unified -- the control approach and a hardware configuration -- simple -- carrying out -- in addition -- and improvement in a playback response can be realized at the time of playback, without adding new buffer memory by assigning the buffer memory for record to playback.
[0016]
[Embodiment of the Invention] It explains referring to a drawing about the gestalt of operation of the signal record regenerative apparatus concerning this invention hereafter.
[0017] It is a video-signal record regenerative apparatus which elongates the compression digital video signal recorded on this optical disk, and is reproduced while recording it on the optical disk which is the record medium contained in the optical disk drive 1, since the band compression of the analog video signal inputted is changed and carried out to a digital video signal, and after the gestalt of this operation carries out the band compression of the digital video signal by which a direct input is carried out.
[0018] This video-signal record regenerative apparatus comes to have the integrated buffer memory 22 which carries out adjustable [of the assignment of the storage region the object for recording systems, and for reversion systems], and the system controller 5 which controls the above-mentioned storage region quota processing of the integrated buffer memory 22 according to the recording system mode or reversion system mode for which a user asks through the record control signal input section 3 or the playback control signal input section 4, as shown in drawing 1 .
[0019] The storage region for buffer memory section 22for recording systems a and the above-mentioned reversion systems is described in drawing 1 for the storage region for the above-mentioned recording systems of the integrated buffer memory 22 as buffer memory section 22for reversion systems b. Such buffer memory section 22a for recording systems and buffer memory section 22b for reversion systems make the area adjustable by control of the system controller 5 through the memory control section 27. For example, at the time of record, buffer memory section 22a for recording systems occupies all the integrated buffer memory 22. Moreover, at the time of playback, buffer memory section 22b for reversion systems occupies all. Moreover, you may make it secure memory space by one half at the time of coincidence record playback.
[0020] Moreover, this video-signal record regenerative apparatus is equipped with the record processor 10 for recording the above-mentioned analog video signal or a digital video signal on the above-mentioned optical disk, and the regeneration system 30 for reproducing the digital video signal currently recorded on the above-mentioned optical disk.
[0021] Moreover, the optical disk drive 1 comes to have head 1b for irradiating the laser beam for playback and reproducing a digital video signal, and spindle motor 1c which carries out the rotation drive of this optical disk 1 while it irradiates the laser beam for record and records a digital video signal on optical disk 1a, as shown in drawing 2 . Head 1b and spindle motor 1c are controlled by the disk / head control section 2.
[0022] First, the configuration and actuation of the record processor 10 are explained. The record processor

10 For example, the video-signal processing section 14 which performs video-signal processing to a video-signal input from Analog TVR, The camera signal-processing section 15 which performs signal processing to an image pick-up signal from a camera system, The tuner section 16 which performs signal processing to the broadcast video signal received with the antenna, The video-signal switch section 17 which switches the video signal from each [these] signal-processing section, The video-signal A/D-conversion section 18 which changes the switch video signal from this video-signal switch section 17 into a digital video signal, It comes to have the video-signal control section 20 which switches the digital video-signal input by which a direct input is carried out to this conversion digital video signal, and the video-signal band compression processing section 21 which performs band compression processing to a digital video signal from this video-signal control section 20.
[0023] The above-mentioned video-signal input inputted from input terminals 11, 12, and 13, a camera system input, and an antenna system input are the video-signal processing section 14, the camera signal-processing section 15, and the tuner system signal-processing section (image system) 16, and video-signal processing, camera signal processing, and tuner system (image system) signal processing are performed, respectively, and they are supplied to the video-signal switch section 17.
[0024] This video-signal switch section 17 is controlled by the system controller 5, and chooses a desired video signal from each above-mentioned input video signal. According to the contents which the user set to the system controller 5 through the user interface which is not illustrated, the record control signal input section 3 supplies a record control signal. And the video signal of the request chosen in the video-signal switch section 17 is supplied to the video-signal A/D-conversion section 18.
[0025] The video-signal A/D-conversion section 18 changes the video signal of the above-mentioned request into a digital signal, and supplies it to the video-signal control section 20.
[0026] Like the video-signal switch section 17, according to control of the system controller 5 according to a setup of a user, one is chosen from any of a digital image input which are inputted from the digital image from the video-signal A/D-conversion section 18, and an input terminal 19, and the video-signal band compression processing section 21 is supplied in the video-signal control section 20. In the video-signal band compression processing section 21, band compression, such as MPEG and JPEG, is performed to a video signal from the video-signal control section 20.
[0027] Through a bus, the address is specified by the memory control section 27 controlled by the system controller 5, and the digital video signal by which band compression was carried out in the video-signal-band compression processing section 21 is stored in buffer memory section 22a for recording systems of the integrated buffer memory 22.
[0028] The digital video signal stored in buffer memory section 22a for recording systems is recorded on optical disk 1a of the optical disk drive 1 through a bus and the data-processing section 6. In the optical disk drive 1, generating of seeking and a track jump generates the latency time. When this latency time occurs, supply to the optical disk drive 1 of the above-mentioned digital video signal from the integrated buffer memory 22 must be stopped.
[0029] Here, the data-processing section 6 consists of record signal-processing section 6a and regenerative-signal processing section 6b, as shown in drawing 2 . At the time of a record processor, record signal-processing section 6a functions, and predetermined record processing is performed to the digital video signal for record.
[0030] A system controller 5 has also managed the condition of the optical disk drive 1, tells the information to the memory control section 27, and controls supply of the data from the integrated buffer memory 22 at the same time it performs control of the optical disk drive 1 through a disk / head control section 2.
[0031] Next, the configuration and actuation of the regeneration system 30 are explained. The regeneration system 30 comes to have the video-signal-band elongation processing section 31 which performs band expanding processing to the video signal supplied through a bus from buffer memory section 22for reversion systems b of the integrated buffer memory 22, the video-signal control section 20 which switches the video signal from this video-signal-band elongation processing section 31, and the video-signal D/A transducer 32 which changes into an analog video signal the video signal switched by the video-signal control section 20.
[0032] At the time of a playback mode, a servo, head migration, etc. are controlled by the disk / head control section 2, and the optical disk drive 1 outputs a playback video signal to the above-mentioned buffer memory section 22b for reversion systems through the regenerative-signal processing section of the data-

processing section 6. Buffer memory section 22b for reversion systems supplies a playback video signal to the video-signal-band elongation processing section 31, maintaining the writing of the above-mentioned playback video signal, and the balance of read-out.
[0033] In the video-signal-band elongation processing section 31, after performing elongation processing of MPEG, JPEG, etc. to the above-mentioned playback video signal, the video-signal control section 20 is supplied.
[0034] The video-signal control section 20 is controlled by the system controller 5 based on the information acquired through the playback control signal input section 4 according to the setup of a user, performs switch processing later mentioned from the video-signal-band elongation processing section 31 to a digital video signal, and supplies it to the video-signal D/A transducer 32 or an output terminal 34.
[0035] The video-signal D/A transducer 32 changes into an analog video signal the digital video signal which switched and was controlled by the video-signal control section 20, and supplies it to an output terminal 33.
[0036] The detailed configuration of the video-signal control section 20 is shown in drawing 3 . This video-signal control section 20 consists of a transfer switch SW1 and a transfer switch SW2. The selected terminal a with which, as for a transfer switch SW1, the digital video-signal input from an input terminal 19 is supplied The selected terminal b and the video-signal-band elongation processing section 31 (it considers as the MPEG decoder which performs MPEG decoding.) to which the digital video signal from the video-signal A/D-conversion section 18 is supplied through an input terminal 36 from -- the selected terminal c with which a decoding video signal is supplied, and the video-signal band compression processing section 21 (it considers as the MPEG encoder which performs MPEG encoding processing.) It comes to have the piece d of a switch which switches and supplies an input. Moreover, a transfer switch SW2 comes to have the piece g of a switch which switches to the video-signal D/A transducer 32 through the selected terminal e with which the digital video signal from the above-mentioned input terminal 36 is supplied, and the selected terminal f and output terminal 37 to which the decoding video signal from the MPEG decoder 31 is supplied, and supplies an output.
[0037] A switch of the above-mentioned switch SW1 and switch SW2 in this video-signal control section 20 is controlled by the system controller 5. If it says that the command from a user supplied to the system controller 5 through the record control signal input section 3 specifies the external digital video signal from an input terminal 19 as an input, and specifically records on optical disk 1a, the piece d of a switch of the above-mentioned switch SW1 will be connected to the selected terminal a. Moreover, if the above-mentioned digital conversion image input is specified and recorded, the piece d of a switch will be connected to the selected terminal b. And if it is a command of connecting and editing the image input of one of the above, and the image data reproduced with the optical disk drive 1, and recording on optical disk 1a again, a system controller 5 will control the timing which connects the piece d of a switch to the selected terminal c. That is, the decode output from the MPEG decoder 31 is fed back to the direct MPEG encoder 21. Thereby, connector edit in the one-frame unit mentioned later is realizable.
[0038] By the way, with the conventional video-signal record regenerative apparatus, although the memory of dedication was independently arranged before the video-signal-band elongation processing section 31 the video-signal band compression processing section 21 back, respectively, by this invention, they are unified and it is considering as the integrated buffer memory 22.
[0039] That is, the amount of signal generation from the video-signal-band compression processing section 21 increases at the time of record, and although the exclusive buffer memory of a recording system overflowed and the system has failed in the conventional video-signal record regenerative apparatus when the latency time of the optical disk drive 1 is large, buffer memory section 22b for reversion systems is diverted to buffer memory section 22a for recording systems by control of a system controller 5 in such a case in this invention.
[0040] Moreover, although the exclusive buffer memory of a reversion system will have carried out the underflow of the time of playback if there is much frequency of seeking or a track jump, in this invention, buffer memory section 22a for recording systems is diverted to buffer memory section 22b for reversion systems.
[0041] The example of the memory access condition in the integrated buffer memory 22 at the time of record is shown in drawing 4 . Since the memory of a recording system and a reversion system was divided conventionally, the capacity was 2n, respectively, but in this invention, since buffer memory section 22a for

recording systems and buffer memory section 22b for reversion systems are unified, memory space usable at the time of record is set to 4n.
[0042] Record actuation shall be started, if the signal shall be inputted into the integrated buffer memory 22 from current and the video-signal-band compression processing section 21 to n and it is saved to n.
[0043] Therefore, since it is record in Phase1, a signal is outputted from the integrated buffer memory 22, and it writes in the optical disk drive 1. The write-in transfer rate to optical disk 1a is made into twice from the video-signal-band compression processing section 21 to the rate inputted into the integrated buffer memory 22. For example, when the write-in transfer rates from the video-signal-band compression processing section 21 to the integrated buffer memory 22 are 10Mbps(es), the write-in transfer rate to optical disk 1a is set to 20Mbps(es).
[0044] In Phase2, since the integrated buffer memory 22 became empty, the optical disk drive 1 changes to a waiting state. Or the latency time accompanying the head migration generated in order to write in another area is also included. When a signal is inputted into the integrated buffer memory 22 from the video-signal-band compression processing section 21 and n is reached in the meantime, it changes in record actuation of Phase3. Usually, since the capacity of the integrated buffer memory 22 is determined from the worst value of the latency time by head migration, this memory 22 does not cause overflow.
[0045] However, if a servo separates in the optical disk drive 1 by vibration, a shock, etc., or writing becomes impossible with the crack on optical disk 1a, dust, etc. and the latency time becomes longer than a steady state, as shown in Phase4, the write-in time amount to the integrated buffer memory 22 will become long, and the amount of this memory 22 used will increase.
[0046] Conventionally, since the memory space of a recording system was 2n, the shadow area of drawing is overflowed, record is impossible, but with the gestalt of this operation, since overflow is not caused, record does not break off.
[0047] At Phase5, in order to record the signal which collected too much in Phase4 by the same time amount as former, it records at a twice as many transfer rate (40Mbps) as this.
[0048] Other examples of the memory access condition at the time of record are shown in drawing 5 . Phase3 is the same as that of above-mentioned drawing 4 . If the amount of signal generation from the video-signal band compression processing section 21 becomes twice former by a certain factor by Phase4, as mentioned above, overflow of buffer memory will occur in the conventional example. When an image for example, with much scene CHANJI is inputted or the digital input of the compression signal with an unknown bit yield is carried out, the case where it enters with a bit rate higher than what carried out a compression setup can be considered to be a certain factor here. However, since memory space of buffer memory section 22a for recording systems is set to 4n with the gestalt of this operation, overflow is not caused too and record does not break off.
[0049] Moreover, the example of the memory access condition at the time of playback is shown in drawing 6 . Here, conventionally, the memory of a recording system and a reversion system was divided and the capacity was 2n, respectively. With the gestalt of this operation, since the integrated buffer memory 22 is used, the usable memory space at the time of playback is set to 4n.
[0050] If a signal is outputted to current and the video-signal-band elongation processing section 31 from the integrated buffer memory 22 to 3n, playback actuation shall be started in the optical disk drive 1. Therefore, since it is playback in Phase1, a signal is read from optical disk 1a, and it writes in the integrated buffer memory 22. The write-in transfer rate from the optical disk drive 1 to the integrated buffer memory 22 is made into twice from the integrated buffer memory 22 to the rate outputted to the video-signal-band elongation processing section 31. For example, in 10Mbps, the rates to the video-signal-band elongation processing section 31 of the read-out transfer rate of optical disk 1a are 20Mbps(es). In Phase2, since the integrated buffer memory 22 became full, the optical disk drive 1 changes to a waiting state. Or the latency time accompanying the head migration generated in order to perform read-out from separate area is also included.
[0051] When a signal is outputted to the video-signal-band elongation processing section 31 from the integrated buffer memory 22 and it amounts to 3n in the meantime, it changes in playback actuation of phase3. Usually, since memory space is determined from the worst value of the latency time by head migration, the integrated buffer memory 22 does not cause an underflow.
[0052] However, if the servo of the optical disk drive 1 separates by vibration, a shock, etc., read-out becomes impossible and the latency time becomes longer than a steady state, as shown in Phase4, the

output time amount from the integrated buffer memory 22 will become long, and the residue of the data in this memory 22 will become less to 1.5n.
[0053] Conventionally, since the memory space of a reversion system was 2n, the slash section of drawing became an underflow, the regenerative signal has broken off, but in this invention, since the memory space of buffer memory section 22b for reversion systems is 4n, an underflow is not caused and a regenerative signal does not break off.
[0054] At Phase5, in order to compensate with the signal which decreased too much by Phase4, it reproduces at a twice as many transfer rate (40Mbps) as this.
[0055] The example of the memory access condition at the time of coincidence record playback is shown in drawing 7 . It controls by dividing the inside of the integrated buffer memory 22 into two at the time of coincidence record playback. That is, the buffer memory sections 22a, 2n-4n for recording systems are used for buffer memory section 22b for reversion systems for 0-2n.
[0056] If Phase1 is record actuation, by the recording system, it will write in the optical disk drive 1 until the memory space of buffer memory section 22a for recording systems is set to 0 from 2n. A reversion system outputs to coincidence at the video-signal-band elongation processing section 31. Since Phase(s)2 are the latency times, such as head migration, in a recording system, the writing to the optical disk drive 1 is stopped. A front condition is maintained in a reversion system. Since Phase3 is playback actuation, a recording system maintains a front condition, a reversion system performs read-out from the optical disk drive 1, and it writes it in buffer memory section 22b for reversion systems. Since Phase4 is the latency time again, a recording system maintains a front condition and a reversion system stops read-out. Henceforth, synchronous record playback is realized by repeating actuation of Phase1 to Phae4.
[0057] The example of a memory access condition when the unexpected latency time occurs at the time of coincidence record playback is shown in drawing 8 . Phase1 to Phase3 is the same as above-mentioned drawing 7 explained. When record/playback becomes impossible by a certain cause by Phase4, conventionally, as shown in drawing, a lifting and record broke off overflow in the slash field A, and a lifting and playback have broken off the underflow in the slash field C. In this invention, since the buffer memory of record and playback is unified like the integrated buffer memory 22, overflow of the slash field A can be prevented by using the slash field B assigned to the reversion system. Moreover, since the slash field C does not have data, it cannot protect, but since record does not break off, buffer memory control of record priority is realizable.
[0058] Moreover, as the video-signal band compression processing section 21 and the video-signal-band elongation processing section 31, as shown in drawing 3 , connector edit in the frame unit which constitutes GOP is realizable in the video-signal record regenerative apparatus of the gestalt of this operation, by using the MPEG encoder 21 and an MPEG decoder.
[0059] The video signal compressed by the MPEG encoding method has GOP structure, generally, when carrying out edit in a frame unit, once, is returned to an analog signal and is performing re-encoding flatly. With the gestalt of this operation, the time amount of image quality degradation can be minimized by re-encoding only GOP of the knot section of edit by feeding back to the MPEG encoder 21 from the MPEG decoder 31.
[0060] It ties and photographs with reference to drawing 9 , and IN point of edit is explained. Here, the case where the conversion digital video signal supplied to the selected terminal b of the switch SW1 of the video-signal control section 20 from the video-signal A/D-conversion section 18 through an input terminal 36 is connected and edited into the image data reproduced from the optical disk 1 is explained.
[0061] The case where the data after Ba of the input data used as the A/D-conversion output shown after B4 of GOP2 at (b) of drawing 9 among the data on optical disk 1a shown in (a) of drawing 9 are connected is assumed. In this case, it is necessary to make B4 of GOP2 into P picture, and GOP which consists of B1, B-2, and I3 and P4 (B4) needs to be materialized.
[0062] In order to decode GOP two B1 and B-2, P15 is required, and I3 is needed in order to decode P15. Therefore, when tying and editing in B4, it is necessary to obtain the data on an optical disk from GOP1 in front of 1GOP.
[0063] First, the piece d of a switch of SW1 of the video-signal control section 20 is connected to the selected terminal c by control of a system controller 5. Then, the decode output from the MPEG decoder 31 is supplied to the MPEG encoder 21 through a switch SW1.
[0064] The MPEG encoder 21 starts re-encoding, as shown in (c) of drawing 9 from 2 GOPI3. And when B4

is changed into P4, a system controller 5 switches the piece d of a switch of a switch SW1 to the selected terminal b.
[0065] The MPEG encoder 21 encodes the input data which begins from Ba shown in (b) of drawing 9 R> 9 succeedingly, and as shown in (c) of drawing 9 , it generates it with Ic, Ba, and Bb. Since Ba and Bb serve as only backward prediction at this time, a closed (Closed) GOP flag is added to the header of GOP. the MPEG encoding outputs I3 and B1 which this shows to (c) of drawing 9 , B-2, and P4 -- then, the MPEG encoding outputs Ic, Ba, Bb, and Pf ... can be connected and it can record on an optical disk 1 as (d) of drawing 9 .
[0066] Here, if the MPEG encoder 21 and the MPEG decoder 31 are asynchronous and are operating, since a Vertical Synchronizing signal will become discontinuous and a knot will be confused at the time of a switch of a switch SW1, continuous connector processing is realized by operating the MPEG encoder 21 and the MPEG decoder 31 synchronizing with input data.
[0067] The example of the memory access condition in the time of this edit (tying and photographing IN point) is shown. here, the same (for example, 10Mbps(es)) in all (read-out rate of memory area 22b for = reversion systems) of the transfer rate of reading/writing from the optical disk drive 1 and the output rate (write-in rate of memory area 22a for = recording systems) of the MPEG encoder 21, and the input rate of the MPEG decoder 31 -- ** -- it carries out.
[0068] First, in "the playback 1 condition (it is described in drawing as playback 1)", from the head of GOP (GOP1) in front of [of GOP (GOP2) in which a frame to connect exists] one, read-out is performed from optical disk 1a, and it writes in memory area 22b for reversion systems.
[0069] next, there is memory area 22b for reversion systems -- if it collects a grade, it will output to the MPEG decoder 31 by "playback 2." Here, there shall be no signal delay of I/O of the MPEG decoder 31. In this the "playback 2", writing and read-out of memory area 22b for reversion systems take place to coincidence, and since the rate of R/W is the same, memory space does not change.
[0070] Next, in "waiting 1", if GOP1 and GOP2 are not continuously written to optical disk 1a or the latency time by migration of a head occurs by a certain factor, since the supply from the optical disk drive 1 will stop at memory area 22for reversion systems b and it will become only the consumption to the MPEG decoder 31, as shown in drawing, memory space decreases.
[0071] Actuation of memory area 22b for reversion systems in "playback 3" and the "record playback 1" is the same as "playback 2."
[0072] If the optical disk drive 1 reads a video signal to B4 of GOP2 required for re-encoding, since it is unnecessary, playback actuation will be stopped henceforth, but memory area 22b for reversion systems outputs to the MPEG decoder 31 to the end of B4, as shown in "the record playback 2."
[0073] Memory area 22b for reversion systems does not access until playback actuation is started again henceforth. ("Waiting 2", "record 1", "record 2") . Moreover, it is not accessing but memory area 22a for recording systems is standing by until record actuation is started ("playback 1", "playback 2", "waiting 1", "playback 3").
[0074] Next, the piece d of selection of a transfer switch SW1 is connected to the selected terminal c, and memory area 22a for recording systems starts writing, and accumulates a signal to some extent at the same time the signal re-encoded from the MPEG encoder 21 is outputted. ("The record playback 1", the "record playback 2", "waiting 2") If the writing to the optical disk drive 1 starts as shown in "record 1", since supply and consumption become the same, the memory space of the memory area for recording systems will not change.
[0075] After the output from the MPEG encoder 21 finishes, as shown in "record 2", all the data that remained in memory area 22a for recording systems are written in the optical disk drive 1, and it ends.
[0076] Next, it explains, referring to drawing 10 about the OUT point in connector edit in an one-frame unit. The case where B11 or subsequent ones of the data on the optical disk shown at (a) of drawing 10 after Pf of the input data which is the A/D-conversion output of (c) of drawing 1010 are connected is explained. Here, input data is made into the conversion digital video signal supplied to the selected terminal b of the switch SW1 of the video-signal control section 20 from the video-signal A/D-conversion section 18 through an input terminal 36.
[0077] In this case, the MPEG encoder 21 performs re-encoding of B11 to P17, and outputs (c) of drawing 10 . That is, since the piece d of switch selection of a switch SW1 has connected with the selected terminal b in the beginning, the MPEG output from the MPEG encoder 21 to an optical disk 1 serves as Ic, Ba, Bb,

Pf, Bd, and Be, as shown in (d) of drawing 10 . If the MPEG encoder 21 encodes and the optical disk drive 1 records so far, a system controller 5 will go into the mode which reproduces data from optical disk 1a, and will supply the data after a knot B11 to the MPEG decoder 31 from the optical disk drive 1 at the same time it switches the piece d of a switch of a switch SW1 to the selected terminal c.
[0078] The MPEG encoder 21 re-encodes B11 or subsequent ones of the MPEG decoding output shown in (b) of drawing 10 , and remakes it with I13, B11, B12, and ... The output shown in (d) of drawing 10 from this MPEG encoder 21 serves as write-in data shown in (e) of drawing 10 , and is recorded on an optical disk 1.
[0079] In addition, since B11 and B12 are only backward prediction, a closed GOP flag is added to a GOP header. Moreover, since it cannot decode after B16 of the next GOP, and B17, a broken link (Broken Link) flag is added to a GOP header.
[0080] The example of the memory access condition in the time of this edit (tying and photographing OUT point) is explained using drawing 10 . Various conditions presuppose that it is the same as drawing 9 .
[0081] First, by "playback 1", from the head of GOP (GOP1) in front of [of GOP (GOP2) in which a frame to connect exists] one, read-out is performed from optical disk 1a, and it writes in memory area 22b for reversion systems.
[0082] Next, if memory area 22b for reversion systems collects to some extent, it will output to the MPEG decoder 31 ("playback 2", "record playbacks 1, 2, and 3"). Here, there shall be no signal delay of I/O of the MPEG decoder 31. In "playback 2", writing and read-out of memory area 22b for reversion systems take place to coincidence, and since the rate of R/W is the same, memory space does not change.
[0083] In "the record playback 4", since it has ended, only the output to the MPEG decoder 31 is performed and read-out by the optical disk drive 1 is ended by "record 2."
[0084] It is not accessing but memory area 22a for recording systems is standing by until record actuation is started. ("Playback 1", "playback 2") .
[0085] Next, as shown in "the record playback 1", memory area 22a for recording systems starts writing, and accumulates a signal to some extent, at the same time the piece d of selection of a transfer switch SW1 is connected to the selected switch b, the output of the video-signal A/D-conversion section 18 is supplied to the MPEG encoder 21 from an input terminal 36 and encoding data are outputted from this MPEG encoder 21.
[0086] If the writing to optical disk 1a starts with the optical disk drive 1, since supply and consumption become the same, memory space will not change ("the record playbacks 2, 3, and 4", "record 2").
[0087] After the output from the MPEG encoder 21 finishes, as shown in "record 3", the optical disk drive 1 writes all the data that remained in memory area 22a for recording systems in optical disk 1a, and it ends.
[0088] It is because B16 cannot perform having ended by 3 GOPI18 here, and the prediction from P17 cannot perform B17 of GOP3, so it is enough if it is necessary to attach a broken link flag and I18 is read for that purpose.
[0089] Thus, with the video-signal record regenerative apparatus shown in above-mentioned drawing 1 , edit processing using an MPEG method can be realized by using the integrated buffer memory 22, without causing an underflow and overflow.
[0090] In addition, the video-signal record regenerative apparatus shown in above-mentioned drawing 1 is good also as a configuration as shown in drawing 11 . That is, the integrated buffer memory 22 may be formed in the video-signal band compression processing section 21 and video-signal-band elongation processing section 31 side rather than a bus 7.
[0091] Furthermore, this invention can also be made into the gestalt of other operations of the image and sound signal record regenerative apparatus which are shown in drawing 12 - drawing 14 although the gestalt of the above-mentioned implementation was a video-signal record regenerative apparatus which carries out record playback of the video signal.
[0092] The image and sound signal record regenerative apparatus used as the gestalt of other operations are explained below.
[0093] As shown in drawing 12 , an image and a sound signal record regenerative apparatus are equipped with the record processor 110 for recording, for example on an optical disk 100 and the buffer-memory section 160 for record processors which is an example of a record medium about the video signal and the sound signal inputted through input terminals 80 and 90, and are equipped with the buffer-memory section 170 for reversion systems and the regeneration system 200 for the optical disk drive 100 to reproduce the

video signal and the sound signal currently recorded on optical Di Xu 1a shown in above-mentioned drawing 2 .
[0094] Moreover, this image and a sound signal record regenerative apparatus The disk / head control section 101 which controls the rotational speed of optical disk 1a in the optical disk drive 100, or irradiates a laser beam at optical disk 1a, and controls writing / optical head to read for an image and a sound signal, The record control signal input section 102 inputted through the human interface which does not illustrate the control signal for recording the above-mentioned image and a sound signal on the optical disk drive 100, The playback control signal input section 103 which inputs the control signal for reproducing the above-mentioned image and a sound signal from an optical disk 100 through a human interface, It comes to have the system controller 104 which controls each above-mentioned processor or a control section based on the above-mentioned record control signal and playback control signal which are supplied from the record control signal input section 102 and the playback control signal input section 103.
[0095] Fundamental actuation of this image and a sound signal record regenerative apparatus is explained.

[0096] First, record actuation is explained. The video signal and sound signal which were inputted through input terminals 80 and 90 are supplied to the record processor 110. This record processor 110 performs predetermined signal processing to the above-mentioned video signal and a sound signal, and supplies it to the buffer memory section 160 for recording systems. The buffer memory section 160 for recording systems outputs a signal to the optical disk drive 100, maintaining the writing of the above-mentioned signal, and the balance of read-out. The above-mentioned signal is recorded by controlling rotation of optical disk 1a by the disk / head control section 101, and controlling servoes, such as optical head migration, by the optical disk drive 100.
[0097] In addition, this record actuation is performed in the procedure explained below. By pushing the record carbon button which specifies a recording mode on the control unit which a user does not illustrate, the record control signal input section 102 generates a record control signal, and this record control signal gives [propagation and this system controller 104] the directions to a control section of it corresponding to the above-mentioned record control signal to the system controller 104 having corresponded [each above-mentioned processor] through a human interface.
[0098] Next, playback actuation is explained. At the time of a playback mode, a servo, head migration, etc. are controlled by the disk / head control section 101, and the optical disk drive 100 outputs a regenerative signal to the buffer memory section 170 for reversion systems. The buffer memory section 170 for reversion systems outputs the above-mentioned regenerative signal to the regeneration system 200, maintaining the writing of the above-mentioned regenerative signal, and the balance of read-out. This regeneration system 200 performs predetermined signal processing to the above-mentioned regenerative signal, obtains a video signal and a sound signal output, and supplies them to output terminals 250 and 260.
[0099] In addition, this playback actuation is performed in the procedure explained below. By pushing the playback carbon button with which a user specifies a playback mode by the control unit, the playback control signal input section 103 generates a playback control signal, and this playback control signal gives [propagation and this system controller 104] the directions to a control section of it corresponding to the above-mentioned playback control signal to the system controller 104 having corresponded [each above-mentioned processor] through a human interface.
[0100] This image and a sound signal record regenerative apparatus also unify the buffer memory section 160 for recording systems, and the buffer memory section 170 for reversion systems in one memory, and use them as the integrated buffer memory 150.
[0101] Since the buffer memory section for recording systems and the buffer memory section for reversion systems were conventionally prepared according to the individual, respectively, when raising a reproductive response, the buffer memory only for playbacks needed to be added further, for example. however, the thing for which the integrated buffer memory 150 which was mentioned above is used -- the control approach of memory, and a hardware configuration -- simple -- it can do -- in addition -- and a playback response can be improved, without adding the buffer memory only for playbacks further, since the buffer memory section 170 for reversion systems can be assigned to recording systems at the time of record or the buffer memory section 160 for recording systems can be assigned to reversion systems at the time of playback.
[0102] Moreover, in this image and a sound signal record regenerative apparatus, when editing into the

signal reproduced from the optical disk drive 100, that edit signal can be again recorded on the optical disk drive 100. What is necessary is just to return a signal to the record processor 110 from the regeneration system 200.
[0103] What is necessary is on the other hand, just to record a regenerative signal via the buffer memory section 160 for recording systems, when changing the physical arrangement on the optical disk drive 100 without performing edit processing to a regenerative signal.
[0104] In the explanation so far, although record processing and regeneration are performed independently, when carrying out to coincidence, read-out/writing of the signal in the optical disk drive 100 are performed by time sharing, and it receives breaking off and can realize by [of the data in this case] compensating with the integrated buffer memory 150.
[0105] The detailed configuration of the record processor 110 is shown in drawing 13 . This record processor 110 consists of a video-signal record processor 111 which performs record processing to the above-mentioned video signal, and a sound signal record processor 125 which performs record processing to the above-mentioned sound signal.
[0106] First, the video-signal record processor 111 is explained. The video-signal input inputted from input terminals 81, 82, and 83, a camera system input, and an antenna system input are the video-signal processing section 112, the camera signal-processing section 113, and tuner system signal-processing section (image system) 114v, and video-signal processing, camera signal processing, and tuner system (image system) signal processing are performed, respectively, and they are supplied to the video-signal switch section 115.
[0107] This video-signal switch section 115 chooses a desired video signal from each above-mentioned input video signal with a system controller 104. According to the contents which the user set to the system controller 104 through the user interface which is not illustrated, the record control signal input section 102 supplies a record control signal. And the video signal of the request chosen in the video-signal switch section 115 is supplied to the video-signal A/D-conversion section 116.
[0108] The video-signal A/D-conversion section 116 changes the video signal of the above-mentioned request into a digital signal, and supplies it to the video-signal control section 117.
[0109] In the video-signal control section 117, one is chosen from any of the digital image input inputted like the video-signal switch section 115 according to control of the system controller 104 according to a setup of a user from the digital image from the video-signal A/D-conversion section 117, and an input terminal 84, or DV input inputted through DV method elongation section 118 from an input terminal 85, and the video-signal band compression processing section 119 is supplied.
[0110] In addition, DV input here is a digital video camera input based on the specification of a home digital video camera, and after conversion is performed so that this record regenerative apparatus may be suited by DV method elongation section 118, the video-signal control section 117 is supplied.
[0111] Moreover, when the record processor 110 uses the playback video signal from the regeneration system 200 for edit etc., the above-mentioned playback video signal is supplied to the video-signal control section 117 through an input terminal 87.
[0112] In the video-signal band compression processing section 119, band compression, such as MPEG and JPEG, is performed to a video signal from the video-signal control section 117, and the video-signal switch section 120 is supplied.
[0113] In the video-signal switch section 120, switch selection with compression digital inputs, such as digital satellite broadcasting service / digital TV broadcast inputted through the compression method transducer 121 from an input terminal 86, and the video signal from the video-signal band compression processing section 119 is performed.
[0114] In addition, to a compression digital input, it is also possible to input data, such as a computer. When this compression digital input does not suit with the recording method of this record regenerative apparatus, conversion is performed by the compression method transducer 121.
[0115] The video signal chosen in the video-signal switch section 120 is supplied to the buffer memory section 161 for image systems which constitutes the buffer memory section 160 for recording systems. This buffer memory section 161 for image systems supplies the above-mentioned video signal to the record data-processing section 105 through a data bus, maintaining the writing of the video signal from the video-signal switch section 120, and the balance of read-out to an optical disk 100.
[0116] Next, the sound signal record processor 123 is explained. The sound signal input inputted from input

terminals 91, 92, and 83, a microphone system input, and an antenna system input are the sound signal processing section 124, the microphone speech processing section 125, and tuner system signal-processing section (voice system) 114a, and sound signal processing, microphone signal processing, and tuner system (voice system) signal processing are performed, respectively, and they are supplied to the sound signal switch section 126.

[0117] The sound signal switch section 126 chooses a desired sound signal from each above-mentioned input sound signal with a system controller 104. According to the contents which the user set to the system controller 104 through the user interface which is not illustrated, the record control signal input section 102 supplies a record control signal. And the sound signal of the request chosen in the sound signal switch section 126 is supplied to the sound signal A/D-conversion section 127.

[0118] The sound signal A/D-conversion section 127 changes the sound signal of the above-mentioned request into a digital signal, and supplies it to the sound signal switch section 128.

[0119] In the sound signal switch section 128, one is chosen from any of the digital voice input inputted according to control of the system controller 104 according to a setup of a user from the digital voice from the sound signal A/D-conversion section 127, and an input terminal 93, or DV input inputted through DV method elongation section 118 from an input terminal 85 like the sound signal switch section 126, and the sound signal processing section 129 is supplied.

[0120] Moreover, when this record processor 110 uses the playback sound signal from the regeneration system 200 for edit etc., the above-mentioned playback sound signal is supplied to the sound signal switch section 128 through an input terminal 94.

[0121] The sound signal processing section 129 consists of voice system buffer memory 130 and the fade processing section 131, and in case it connects the above-mentioned input digital voice which is not following time amount shaft orientations, it adjusts the voice level near the bond part according to the amplitude level difference of the sound signal of the part to connect. When the amplitude level difference of the above-mentioned input digital voice of the part to connect is below a predetermined value, in the fade processing section 131, fade processing is not performed, but when the above-mentioned amplitude level difference is larger than a predetermined value, fade processing is performed. Fade processing here is processing which carries out fade-in of fade-out and the near posterior part of a bond location for the near anterior part of a bond location. The system controller 104 has detected the above-mentioned amplitude level difference. And as mentioned above according to the amplitude difference, a system controller 104 makes the fade processing section 131 perform fade processing, or carries out through. By this sound signal processing section 129, the jarring noise in a bond part can be decreased and generating of a noise called BOTSUTSU generated in a bond part at the time of playback can be suppressed.

[0122] The digital sound signal output from the sound signal processing section 129 is supplied to the sound signal band compression processing section 132. In this sound signal band compression processing section 132, band compression, such as an MPEG audio and AC-3, is performed, and the sound signal switch section 133 is supplied.

[0123] In the sound signal switch section 133, switch selection with compression digital inputs, such as digital satellite broadcasting service / digital TV broadcast inputted through the compression method transducer 121 from an input terminal 86, and the sound signal from the sound signal band compression processing section 132 is performed.

[0124] In addition, when a compression digital input does not suit with the recording method of this system, conversion is performed by the compression method transducer 121.

[0125] The signal chosen in the sound signal switch section 133 is supplied to the buffer memory section 162 for voice systems which constitutes the buffer memory section 160 for recording systems. It multiplexes, the control from the memory control section 164 performing timing of the signal supplied to the buffer memory section 161 for image systems, and the buffer memory section 162 for voice systems, respectively as the buffer memory section 160 whole for recording systems from the video-signal switch section 120 and the sound signal switch section 133 (for example, the program stream and transport stream of an MPEG system). Header information (a hour entry, stream information, etc.) required for multiplexing is supplied from a system controller 104.

[0126] the multiplexed signal -- consumption of the buffer memory section 160 for recording systems, and the balance of supply -- taking -- overflow -- or the record data-processing section 105 is supplied so that an underflow may not be carried out.

[0127] In the record data-processing section 105, to compensate for a record format, rearrangement of data, addition of an error correction sign, and a modulation like EFM are performed, and it records on an optical disk 100. Control of a servo / head migration is performed by a disk / head control section 101, and an optical disk 100 records the above-mentioned record data on the given location by it, as mentioned above.

[0128] In addition, the image and sound signal which were reproduced by the regeneration system 200 other than the buffer memory section 161 for image systems and the buffer memory section 162 for voice systems are not used for edit, but the buffer memory section 160 for recording systems is equipped also with the buffer memory section 163 for a reshuffle used in order to only change and record a record location on an optical disk 100 so that it may illustrate.

[0129] The detailed configuration of the regeneration system 200 is shown in drawing 14. This regeneration system 200 consists of a video-signal regeneration system 201 which regenerates to the video signal which the optical disk drive 100 read from optical disk 1a, and a sound signal regeneration system 220 which regenerates to the sound signal read from the optical disk 100.

[0130] The signal which disk rotation was controlled by the disk / head control section 101, and servoes, such as tracking and focusing, were controlled, and the optical head read is supplied to the playback data-processing section 106.

[0131] In the playback data-processing section 106, according to a playback format, rearrangement of for example, an EFM recovery, an error correction, and data etc. is processed to the above-mentioned read-out signal, and playback data are supplied to the buffer memory section 170 for reversion systems via a data bus.

[0132] The buffer memory section 170 for reversion systems is unified by the integrated buffer memory 150 with the above-mentioned buffer memory section 160 for recording systems.

[0133] Especially this buffer memory section 170 for reversion systems The buffer memory section 171 for compression method conversion used in order to change a compression method when the above-mentioned read-out data are compressed data, The buffer memory section 172 for the image systems 1, and the buffer memory section 173 for the image systems 2, It consists of the buffer memory section 174 for the voice systems 1, the buffer memory section 175 for the voice systems 2, and the buffer memory section 163 for a reshuffle inside [for recording systems / buffer memory section 160] the above and the same buffer memory section 176 for a reshuffle. The buffer memory section 170 for reversion systems constituted by each of these buffer memory sections is controlled by the memory control section 164.

[0134] After the playback data from the playback data-processing section 106 are incorporated by memory control by the memory control section 164 by the buffer memory section 170 for reversion systems, analysis of a header is performed, multiplexing is separated and they can be distributed to each above-mentioned buffer memory section.

[0135] for example, the case of the coincidence 2CH playback which reproduces to coincidence two separate files recorded on optical disk 1a of the optical disk drive 100 -- the image of CH1 -- the buffer memory section 172 for the image systems 1 -- the image of CH2 is supplied to the buffer memory section 173 for the image systems 2, and voice is supplied for voice to the buffer memory section 174 for the voice systems 1 at 2 buffer memory sections 175 for voice systems, respectively.

[0136] and in this reversion system buffer memory section 170, consumption and supply are balanced and capacity is made not to be carried out by control of a system controller 104 and the memory control section 164 overflow/underflow -- time amount doubling of an image and voice is both performed by the hour entry of a header. The video signal from the buffer memory section 172 for the image systems 1 is supplied to the video-signal-band elongation processing section 202. The video signal from the buffer memory section 173 for the image systems 2 is supplied to the video-signal-band elongation processing section 203.

[0137] In the video-signal-band elongation processing section 202 and the video-signal-band elongation processing section 203, after performing elongation processing of MPEG, JPEG, etc. to each above-mentioned input video signal, image switch / composition section 204 is supplied.

[0138] Image switch / composition section 204 is controlled by the system controller 104 based on the information acquired through the playback control signal input section 103 according to the setup of a user, processes switch/composition from the video-signal-band elongation processing section 202 and the video-signal-band elongation processing section 203 to an image, and outputs it to the record processor 110 through the video-signal D/A transducer 205, DV method transducer 206, and an output terminal 207.

Moreover, it derives as a digital image through an output terminal 208.
[0139] In the video-signal D/A transducer 205, D/A conversion is performed to a digital video signal. The analog video signal from this video-signal D/A transducer 205 is drawn from an output terminal 210 as a video-signal output 1, after the video-signal output section 209 is supplied and processing of chroma encoding etc. is performed.
[0140] On the other hand, in DV method compression zone 206, the processing signal from image switch / composition section 204 is changed into DV method, and it derives from an output terminal 211 as a DV output. Moreover, the processing signal supplied to an output terminal 207 from image switch / composition section 204 is supplied to the video-signal control section 117 from the input terminal 87 of the record processor 110, and is used for edit processing etc.
[0141] When outputting an image to 2CH coincidence, after supplying the video signal from the video-signal-band elongation processing section 203 to the video-signal D/A transducer 212 and making it change into an analog video signal, it is made to draw from an output terminal 214 as a video-signal output 2 through the video-signal output-processing section 213.
[0142] On the other hand, in the sound signal band elongation processing section 221 of the sound signal regeneration system 220, and the sound signal band elongation processing section 222, after elongating an MPEG audio, AC-3, etc. to each above-mentioned input sound signal (elongation processing is not carried out at the time of Linear PCM), voice switch / composition section 223 is supplied.
[0143] The voice switch composition section 223 is controlled by the system controller 104 based on the information acquired through the playback control signal input section 103 according to the setup of a user, processes switch/composition from the sound signal band elongation processing section 221 and the sound signal band elongation processing section 222 to a sound signal, and supplies it to the sound signal processing section 224.
[0144] This sound signal processing section 224 consists of voice system buffer memory 225 and the fade processing section 226, and in case it connects the above-mentioned input digital voice which is not following time amount shaft orientations, it adjusts the voice level near the bond part according to the amplitude level difference of the sound signal of the part to connect. When the amplitude level difference of the above-mentioned input digital voice of the part to connect is below a predetermined value, in the fade processing section 226, fade processing is not performed, but when the above-mentioned amplitude level difference is larger than a predetermined value, fade processing is performed. Fade processing here is processing which carries out fade-in of fade-out and the near posterior part of a bond location for the near anterior part of a bond location. The system controller 104 has detected the above-mentioned amplitude level difference. And as mentioned above according to the amplitude difference, a system controller 104 makes the fade processing section 226 perform fade processing, or carries out through. By this sound signal processing section 224, the jarring noise in a bond part can be decreased and generating of a noise called BOTSUTSU generated in a bond part at the time of playback can be suppressed.
[0145] The digital sound signal output from the sound signal processing section 224 is supplied to the above-mentioned DV method compression zone 206. Moreover, the sound signal switch section 128 is supplied through the input terminal 94 of the record processor 110 from an output terminal 227. Moreover, it is drawn from an output terminal 228 as a digital voice output. The sound signal D/A transducer 229 is also supplied further again.
[0146] In the sound signal D/A transducer 229, D/A conversion is performed to a digital sound signal from the sound signal processing section 224. The analog sound signal from this sound signal D/A transducer 229 is supplied to the sound signal output-processing section 230. In the sound signal output-processing section 230, after performing various processings to the above-mentioned analog sound signal, an output terminal 231 is supplied.
[0147] When outputting voice to 2CH coincidence, after supplying the sound signal from the sound signal band elongation processing section 222 to the sound signal D/A transducer 232 and making it change into an analog sound signal, various processings are made to perform in the sound signal output-processing section 233, and it is made to draw from an output terminal 234.
[0148] Moreover, after performing transform processing of a compression method by the compression method transducer 215 through the buffer memory section 171 for compression method conversion to the device (for example, a digital image broadcast receiver, a digital TV receiver) which carried the image / voice elongation system, it is drawn from an output terminal 216 as a compression digitized output. It is also

possible to connect this output to a computer etc.
[0149] In addition, with the above-mentioned video-signal record regenerative apparatus or a video signal, and a sound signal record regenerative apparatus, if record and playback are repeated, fragmentation of the program on optical disk 1a will occur, and seamless playback will become difficult. Furthermore, when it fragments, there is also a case which becomes unreproducible.
[0150] In order to cancel this, relocation of the fragmented program may be performed as shown in drawing 15 . As shown in drawing 16 , A, B, C, and D of the fragmented program 1 are read, and it connects inside [buffer memory 22] the above, and, specifically, records continuously.
[0151] Since record/playback area is unified, the dissolution of fragmentation is attained only by the migration in the integrated buffer memory 22, or migration of a pointer.
[0152]
[Effect of the Invention] unifying the buffer memory of a recording system and a reversion system according to the signal record regenerative apparatus and approach concerning this invention -- a hardware configuration -- simple -- becoming -- in addition -- and generating of the underflow of memory and overflow decreases compared with the former.
[0153] Moreover, generating of the underflow of memory and overflow can be suppressed also at the time of edit.

[Translation done.]

CLAIMS

[Claim(s)]
[Claim 1] The signal record regenerative apparatus which carries out [having the integrated storage means which has a storage region the object for recording systems, and for reversion systems, and carries out adjustable / of the assignment of each of these storage regions / in the signal record regenerative apparatus which reproduces the signal recorded while recording the signal on the record medium, and the control means which control storage region quota processing of the above-mentioned integrated storage means according to desired record and/or the reproductive mode, and] as the description.
[Claim 2] The above-mentioned control means is a signal record regenerative apparatus according to claim 1 characterized by making the storage region of the above-mentioned integrated storage means into recording systems at the time of a recording mode, and carrying out to reversion systems at the time of a playback mode.
[Claim 3] The above-mentioned control means is a signal record regenerative apparatus according to claim 1 characterized by dividing the storage region of the above-mentioned integrated storage means into the object for recording systems, and reversion systems at the time of a coincidence record playback mode.
[Claim 4] The overflowed signal generated in the storage region for recording systems at the time of the above-mentioned coincidence record playback mode is a signal record regenerative apparatus according to claim 3 characterized by being written in the storage region assigned to the above-mentioned reversion system by control of the above-mentioned control means.
[Claim 5] The signal record regenerative apparatus according to claim 1 characterized by using the above-mentioned integrated storage means for edit processing.
[Claim 6] The signal record playback approach characterized by carrying out adjustable [of the quota processing of the storage region the object for the recording systems of the storage section, and for reversion systems] according to desired record and/or the reproductive mode in the signal record playback approach which reproduces the signal recorded while recording the signal on the record medium.
[Claim 7] The signal record playback approach according to claim 6 characterized by making the above-mentioned storage region of the above-mentioned storage section into recording systems at the time of a recording mode, and carrying out to reversion systems at the time of a playback mode.
[Claim 8] The signal record playback approach according to claim 6 characterized by dividing the above-mentioned storage region of the above-mentioned storage section into the object for recording systems, and reversion systems at the time of a coincidence record playback mode.
[Claim 9] The signal record regenerative apparatus according to claim 8 characterized by writing the overflowed signal generated in the storage region for recording systems at the time of the above-mentioned coincidence record playback mode in the storage region assigned to the above-mentioned reversion system.
[Claim 10] The signal record playback approach according to claim 6 characterized by using the above-mentioned storage section for edit processing.

[Translation done.]